**2006-08 ENGINE**

**Starting System (R18A1) - Civic (All Except Hybrid)**

## COMPONENT LOCATION INDEX

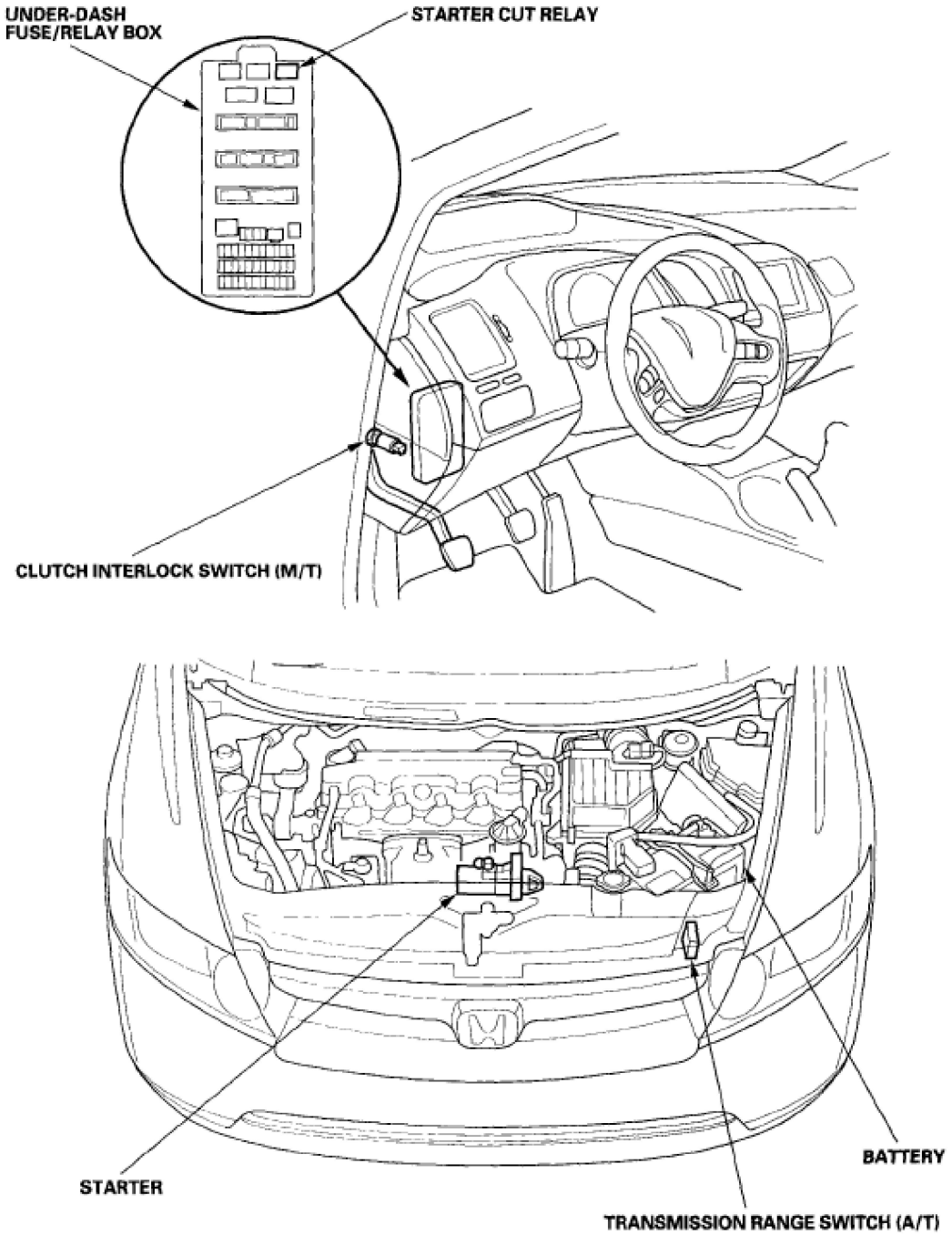


**Fig. 1: Locating Starting System Components**

**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

## SYMPTOM TROUBLESHOOTING INDEX

## SYMPTOM TROUBLESHOOTING INDEX (EXCEPT GX)

| Symptom | Diagnostic procedure | Also check for |
|---|---|---|
| Engine does not start (does not crank) | 1. Check for loose battery terminals or connections.<br>2. Test the battery for a low charge (see **BATTERY TEST** ).<br>3. Check the starter (see **STARTER CIRCUIT TROUBLESHOOTING** ).<br>4. Check the starter cut relay (see **POWER RELAY TEST** ).<br>5. Check the transmission range switch (A/T) (see **TRANSMISSION RANGE SWITCH TEST** ).<br>6. Check the clutch interlock switch (M/T) (see **CLUTCH INTERLOCK SWITCH TEST** ).<br>7. Check the ignition switch or wire (see **IGNITION SWITCH (ALL EXCEPT HYBRID)** ). | Poor ground at G101 (A/T) or G401 (M/T) |
| Engine cranks, but does not | 1. Check for PGM-FI DTCs (see **GENERAL TROUBLESHOOTING INFORMATION** ).<br>2. Check the fuel pressure (see **FUEL PRESSURE TEST** ).<br>3. Check for a plugged or damaged fuel line (see **FUEL LINE INSPECTION** ).<br>4. Check for a plugged fuel filter (see **FUEL PRESSURE REGULATOR** | Fuel level in tank |

| | | |
|---|---|---|
| start | **REPLACEMENT** ).<br>5. Check the throttle body (see **THROTTLE BODY TEST** ).<br>6. Check for low engine compression (see **ENGINE COMPRESSION INSPECTION** ).<br>7. Check for a damaged or broken cam chain. | |
| Engine is hard to start | 1. Check for PGM-FI DTCs (see **GENERAL TROUBLESHOOTING INFORMATION** ).<br>2. Check the fuel pressure (see **FUEL PRESSURE TEST** ).<br>3. Check for a plugged or damaged fuel line (see **FUEL LINE INSPECTION** ).<br>4. Check for a plugged fuel filter (see **FUEL PRESSURE REGULATOR REPLACEMENT** ).<br>5. Check for a restricted three way catalytic converter (TWO or exhaust system. | |
| Engine cranks slowly | 1. Check for loose battery terminals or connections.<br>2. Test the battery for a low charge (see **BATTERY TEST** ).<br>3. Check the starter for binding (see **STARTER OVERHAUL** ).<br>4. Check for excessive drag in the engine. | |

## SYMPTOM TROUBLESHOOTING CHART (GX)

| Symptom | Diagnostic procedure | Also check for |
|---|---|---|
| Engine does not start (does not crank) | 1. Check for loose battery terminals or connections. | Poor ground at G101 |

| | | |
|---|---|---|
| | 2. Test the battery for a low charge, refer to the **BATTERY (ALL EXCEPT HYBRID)** .<br>3. Check the starter, refer to the **STARTER CIRCUIT TROUBLESHOOTING** .<br>4. Check the starter cut relay (see **POWER RELAY TEST** ).<br>5. Check the transmission range switch, refer to the **TRANSMISSION RANGE SWITCH TEST** .<br>6. Check the ignition switch or wire, refer to the **IGNITION SWITCH (ALL EXCEPT HYBRID)** . | |
| Engine cranks, but does not start | 1. Check for PGM-FI DTCs (see **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)** ).<br>2. Check the throttle body, refer to the **THROTTLE BODY TEST** .<br>3. Check for low engine compression, refer to the **ENGINE COMPRESSION INSPECTION** . | |

| | | |
|---|---|---|
| | 4. Check for a damaged or broken cam chain. | |
| Engine is hard to start | 1. Check for PGM-FI DTCs (see **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)** ).<br>2. Check for a restricted three way catalytic converter (TWC) or exhaust system. | |
| Engine cranks slowly | 1. Check for loose battery terminals or connections.<br>2. Test the battery for a low charge, refer to the **BATTERY (ALL EXCEPT HYBRID)** .<br>3. Check the starter for binding, refer to the **STARTER PERFORMANCE TEST** .<br>4. Check for excessive drag in the engine. | |

## CIRCUIT DIAGRAM

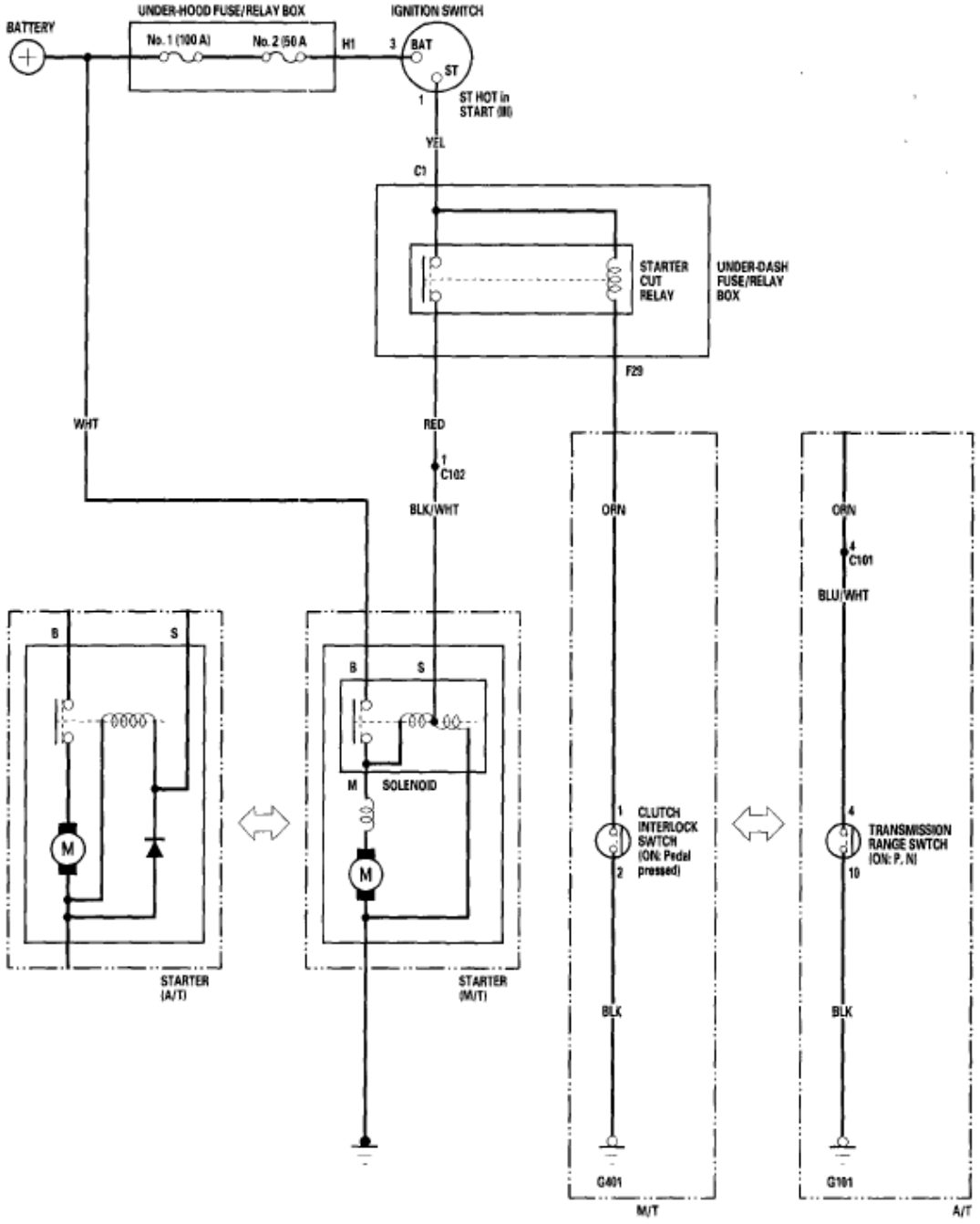


**Fig. 2: Starting System - Circuit Diagram**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

## STARTER CIRCUIT TROUBLESHOOTING

**NOTE:**

- **Air temperature must be between 59 and 100°F (15 and 38°C) during this procedure.**

- **After this inspection, you must reset engine control module (ECM)/powertrain control module (PCM), otherwise the ECM/PCM will continue to stop the fuel injectors from functioning.**
- **The battery must be in good condition and fully charged.**

1. Hook up the following equipment:
   - Ammeter, 0-400 A
   - Voltmeter, 0-20 V (accurate within 0.1 V)

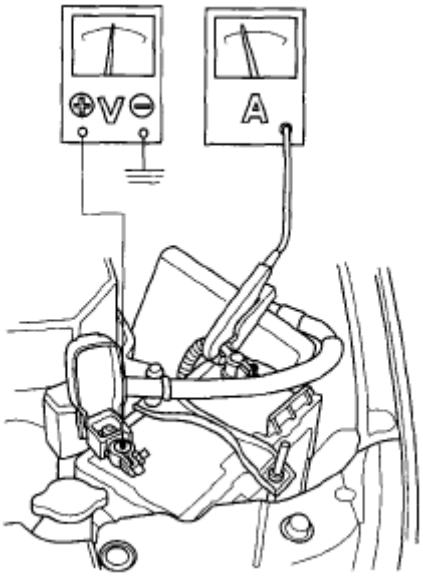


**Fig. 3: Connecting Ammeter And Voltmeter**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

2. Connect the HDS to the data link connector (DLC) (see step 2 in **HOW TO USE THE HDS (HONDA DIAGNOSTIC SYSTEM)** ).
3. Turn the ignition switch ON (II).
4. Make sure the HDS communicates with the vehicle and the ECM/PCM. If it doesn't, troubleshoot the DLC circuit (see **DLC CIRCUIT TROUBLESHOOTING** ).
5. Select PGM-FI, INSPECTION, then ALL INJECTORS OFF on the HDS.

6. Set the parking brake, then with the shift lever in the P or N position (A/T) or the clutch pedal pressed (M/T), turn the ignition switch to START (III).

   *Does the starter crank the engine normally?*

   **YES** - The starting system is OK. Go to step 13.

   **NO** - Go to step 7.

7. Check the battery condition (see **BATTERY TEST** ). Check the electrical connections at the battery, the negative battery cable to the body, the engine ground cables, and the starter for looseness and corrosion. Then try cranking the engine again.

   *Does the starter crank the engine?*

   **YES** - Repairing the loose connection corrected the problem. The starting system is OK. Go to step 13.

   **NO** - Check the following:

   - If the starter will not crank the engine at all, go to step 8.
   - If the starter cranks the engine erratically or too slowly, go to step 10.
   - If the starter does not disengage from the flywheel or torque converter ring gear when you release the key, replace the starter, or remove and disassemble it and check for the following:
     - Solenoid plunger and switch malfunction
     - Dirty drive gear or damaged overrunning clutch

8. Make sure the shift lever is in the N or P position (A/T) or neutral (M/T), and set the parking brake. Disconnect the connector from the starter solenoid S terminal. Connect a jumper wire from the battery positive terminal to the solenoid terminal.

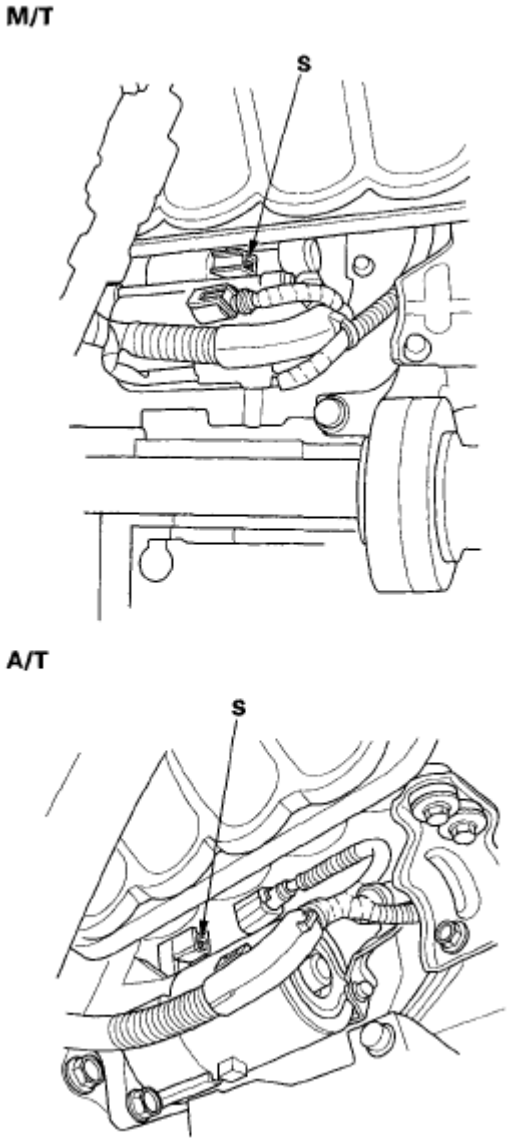


**Fig. 4: Making Sure Shift Lever Is In N Or P Position**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

*Does the starter crank the engine?*

**YES** - Go to step 9.

**NO** - Remove the starter, and repair or replace as necessary.

9. Check the following items in the order listed until you find the open circuit:
    - The YEL wire and connectors between the under-dash fuse/relay box and

the ignition switch.

- The RED and BLK/WHT wire and connectors between the under-dash fuse/relay box and the starter.
- The ignition switch (see **IGNITION SWITCH (ALL EXCEPT HYBRID)** ).
- The transmission range switch and connector (A/T) or the clutch interlock switch and connector (M/T).
- The starter cut relay.

10. While cranking the engine, check the cranking voltage and the current draw.

    *Is the cranking voltage greater than or equal to 8.7 V (M/T)/8.5 V (A/T) and is the current draw less than or equal to 230 A (M/T)/350 A (A/T)?*

    **YES** - Go to step 11.

    **NO** - Replace the starter, or remove and disassemble it, and check for the following:

    - Drag in the starter armature
    - Shorted armature winding
    - Excessive drag in the engine

11. Check the engine speed while cranking the engine.

    *Is the engine speed above 100 rpm?*

    **YES** - Go to step 12.

    **NO** - Replace the starter, or remove and disassemble it, and check for the following:

    - Open circuit in the starter armature commutator segments
    - Excessively worn starter brushes
    - Open circuit in the starter brushes
    - Dirty or damaged helical splines or drive gear
    - Faulty drive gear clutch

12. Remove the starter, and inspect its drive gear and the flywheel or torque converter ring gear for damage. Replace any damaged parts.
13. Select ECM/PCM reset (see **ECM/PCM RESET** ) to cancel ALL INJECTORS OFF on the HDS.

## CLUTCH INTERLOCK SWITCH TEST

**M/T**

1. Disconnect the clutch interlock switch 2P connector (A).

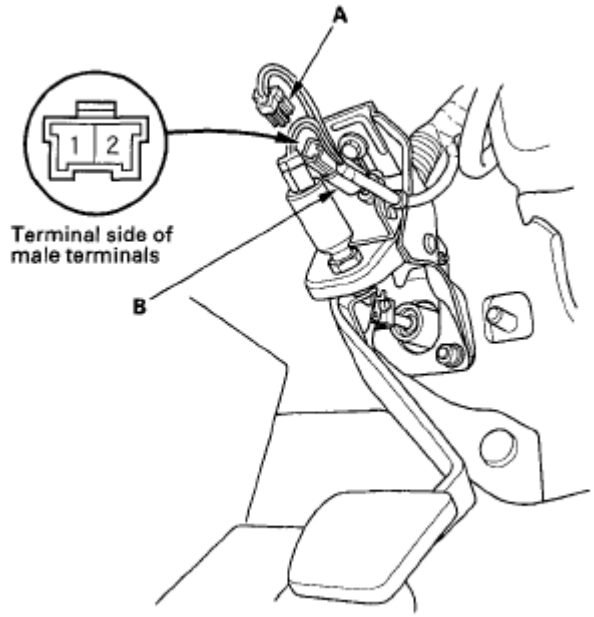


**Fig. 5: Identifying Clutch Interlock Switch 2P Connector**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

2. Remove the clutch interlock switch (B).
3. Check for continuity between the terminals according to the table.
   - If the continuity is not as specified, replace the clutch interlock switch.
   - If OK, install the clutch interlock switch, and adjust the pedal height (see **CLUTCH PEDAL, CLUTCH PEDAL POSITION SWITCH, AND CLUTCH INTERLOCK SWITCH ADJUSTMENT** ).

| Terminal / Clutch Interlock Switch | 1 | 2 |
|---|---|---|
| PRESSED | o——o | |
| RELEASED | | |

**Fig. 6: Checking Continuity Between Clutch Interlock Switch Table**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

## STARTER SOLENOID TEST

**M/T**

1. Remove the starter (see **STARTER REMOVAL AND INSTALLATION** ).
2. Remove the motor cable (A).

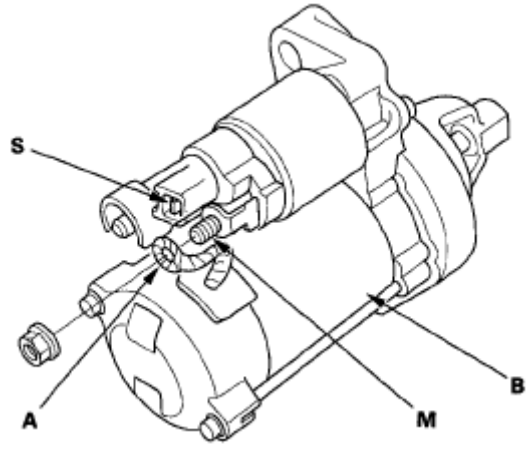


**Fig. 7: Removing Motor Cable**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

3. Check the hold-in coil for continuity between the S terminal and the armature housing (ground) (B). There should be continuity.
   - If there is continuity, go to step 4.
   - If there is no continuity, replace the solenoid.
4. Check the pull-in coil for continuity between the S terminal and the M terminal. There should be continuity.
   - If there is continuity, the solenoid is OK.
   - If there is no continuity, replace the solenoid.

5. Install the motor cable.
6. Install the starter (see **INSTALLATION** ).

## STARTER PERFORMANCE TEST

**M/T**

1. Disconnect the wires from the M terminal.
2. Make a connections for this test using the thickest (gauge) wire possible (preferably the same gauge as used on the vehicle).

**NOTE: To avoid damaging the starter, never leave the battery connected for more than 10 seconds.**

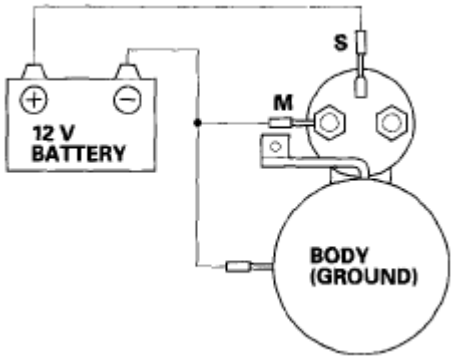


**Fig. 8: Connecting Battery To Starter**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

3. Connect the battery as shown in **Fig. 8**. Make sure you disconnect the starter motor wire from the solenoid. If the starter pinion moves out, it is working properly.
4. Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil of the solenoid is working properly.

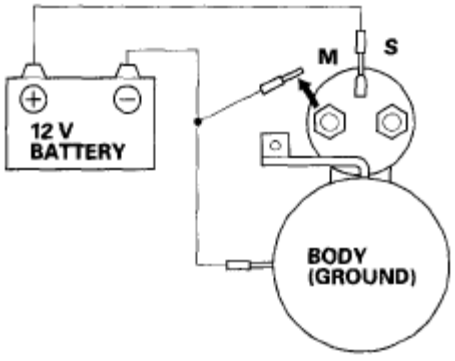


**Fig. 9: Disconnecting Battery From M Terminal**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

5. Disconnect the battery from the starter body. If the pinion retracts immediately, it is working properly.

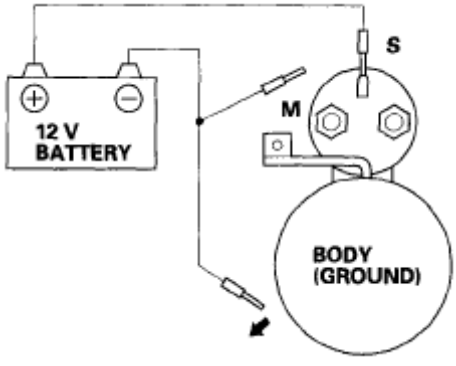


**Fig. 10: Disconnecting Battery From Starter Body**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

6. Firmly clamp the starter in a vise.
7. Reconnect the wire to the M terminal.
8. Connect the starter to the battery as shown, and check that the motor turns and keeps rotating.

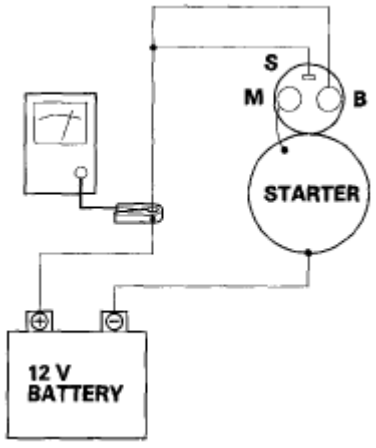


**Fig. 11: Connecting Starter To Battery**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

9. If the electric current meets the specification when the battery voltage is at 11.5 V, the starter is working properly.

   **Specification Electric Current: 90 A or less**

**A/T**

1. Make a connection for this test using the thickest (gauge) wire possible (preferably the same gauge as used on the vehicle).

   **NOTE: To avoid damaging the starter, never leave the battery connected for more than 10 seconds.**

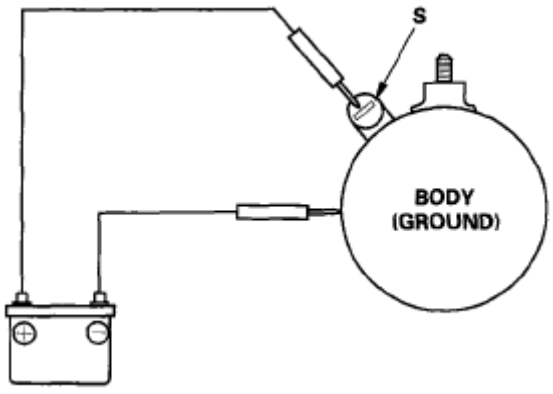


**Fig. 12: Connecting Battery To Starter**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

2. Connect the battery as shown in **Fig. 12**. If the starter pinion moves out, it is working properly.
3. Disconnect the battery from the body. If the pinion retracts immediately, it is working properly.

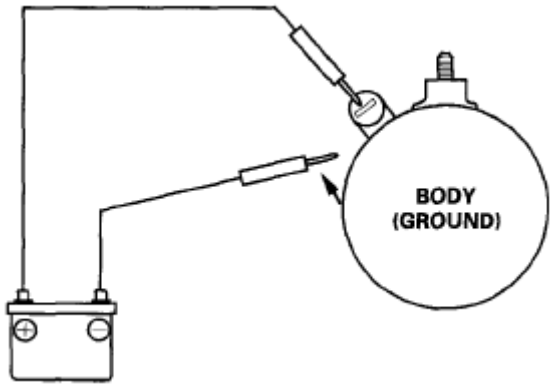


**Fig. 13: Disconnecting Battery From Body**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Firmly clamp the starter in a vise.
5. Connect the starter to the battery as shown, and check that the motor turns and keeps rotating.

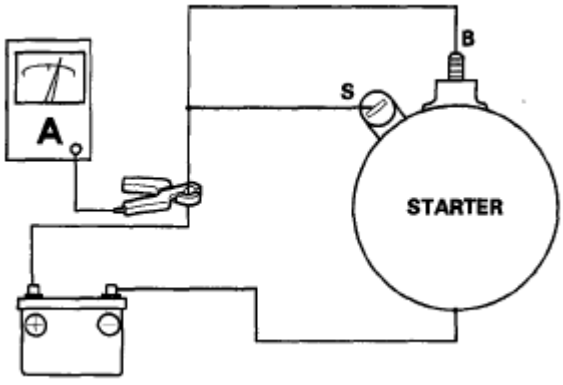


**Fig. 14: Connecting Starter To Battery**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

6. If the electric current meets the specification when the battery voltage is at 11.5 V, the starter is working properly.

**Specification Electric Current: 80 A or less**

## STARTER REMOVAL AND INSTALLATION

**REMOVAL**

1. Make sure you have the anti-theft code for the audio system and the navigation system (if equipped), then write down the audio presets.
2. Disconnect the negative cable from the battery first, then disconnect the positive cable.
3. Remove exhaust pipe A.

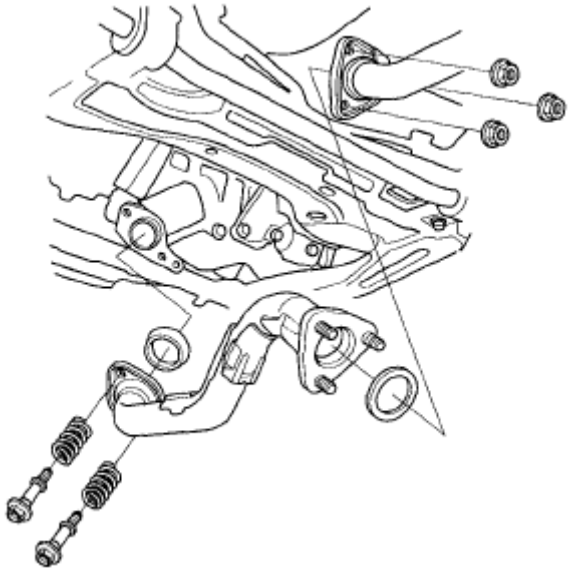

**Fig. 15: Removing Exhaust Pipe A**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Remove the intake manifold bracket.

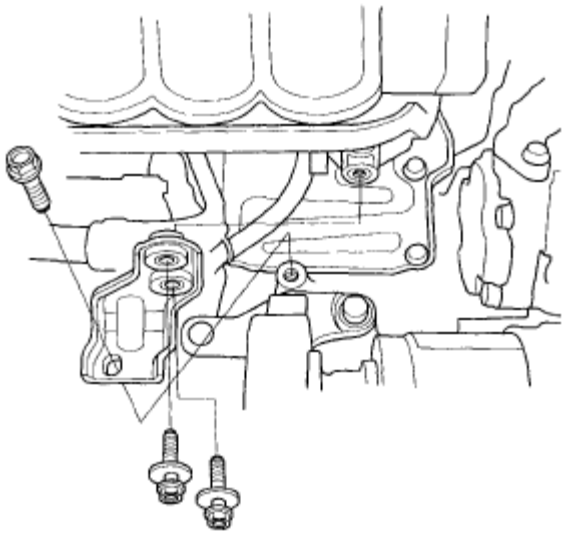

**Fig. 16: Removing Intake Manifold Bracket**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

5. Remove the harness clamps (A) and harness connector (B) from each clamp.

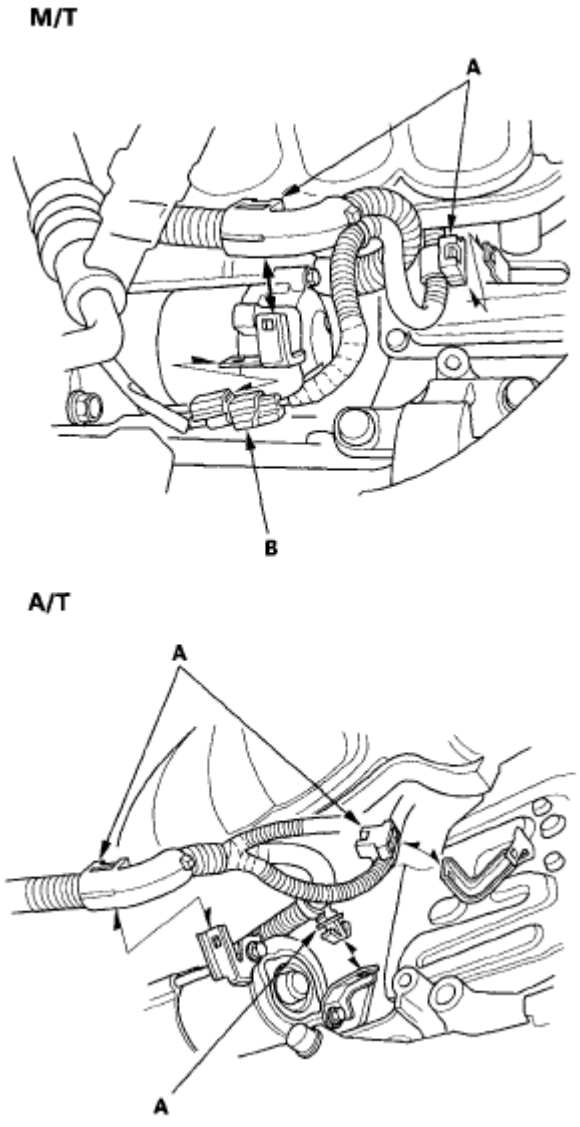


**Fig. 17: Removing Harness Clamps And Harness Connector**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

6. Remove the two bolts securing the starter, then remove the starter from the engine.

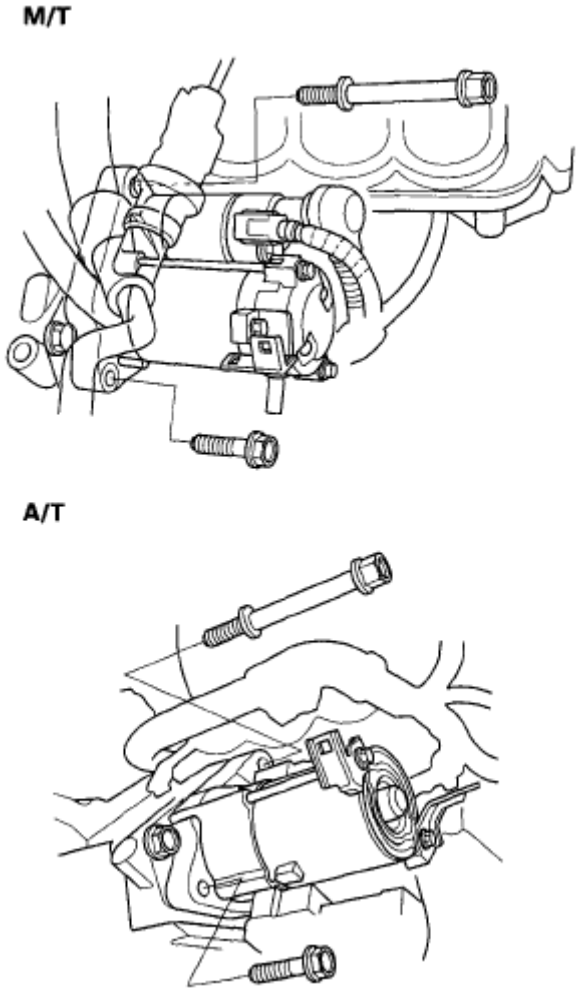


**Fig. 18: Removing Starter**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

7. Disconnect the starter cable (A) from the B terminal. Disconnect the connector (B) from the S terminal, then remove the starter.

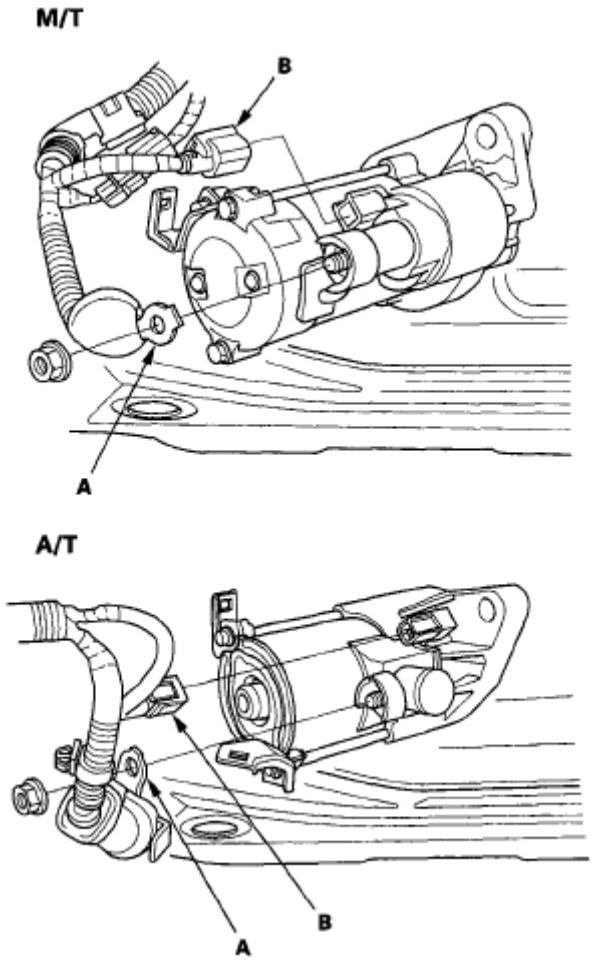


**Fig. 19: Disconnecting Starter Cable From B Terminal**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**INSTALLATION**

1. Install the starter cable (A) and connector (B). Make sure the starter cable crimped side of the ring terminal faces away from the starter when you connect it.

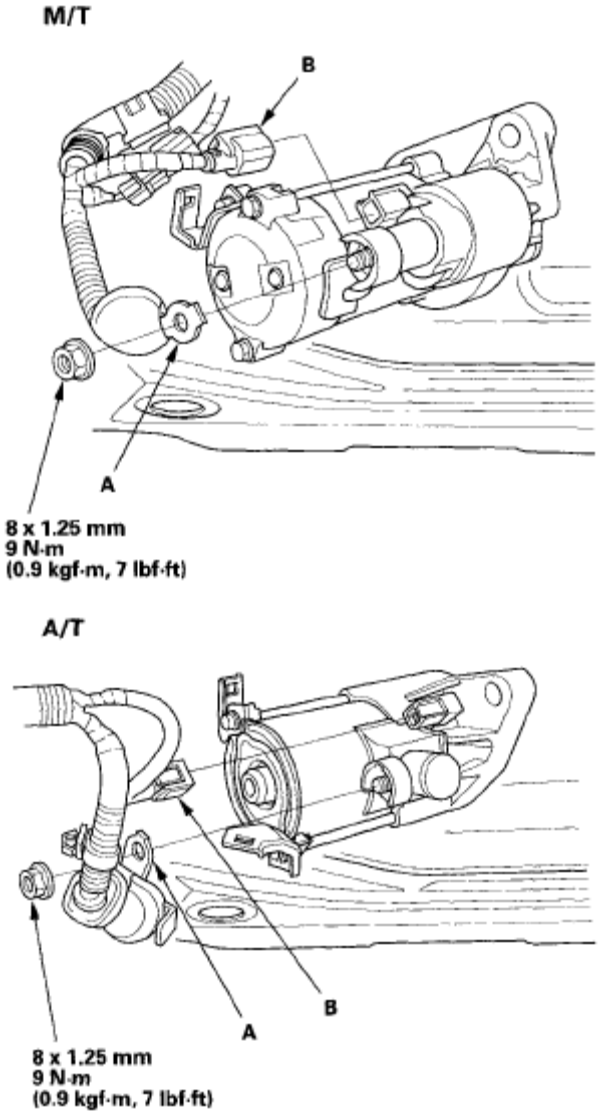


**Fig. 20: Installing Starter Cable And Connector (With Specifications)**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

2. Install the starter, then loosely install the upper mounting bolt (A) and lower mounting bolt (B).

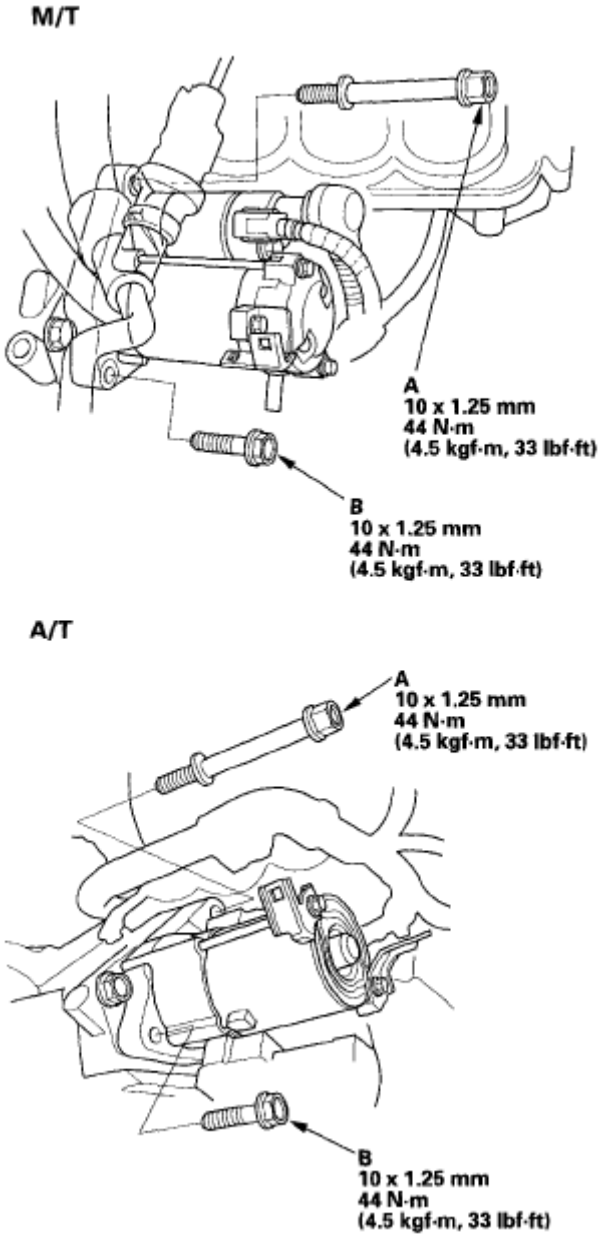


**Fig. 21: Installing Starter (With Specifications)**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

3. Tighten the upper mounting bolt, then tighten the lower mounting bolt.
4. Install the harness clamps (A) and harness connector (B) to each clamp.

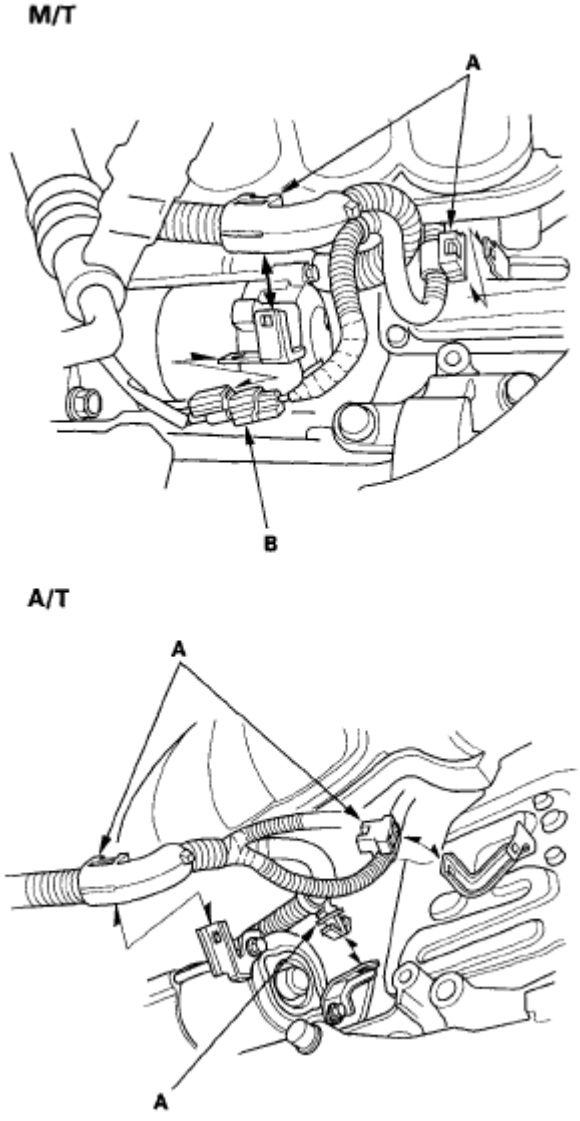


**Fig. 22: Installing Harness Clamps And Harness Connector To Each Clamp**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

5. Install the intake manifold bracket.

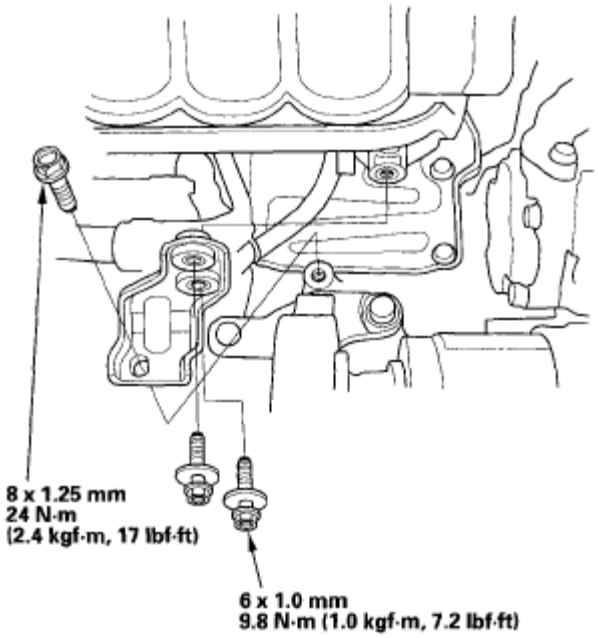


**Fig. 23: Installing Intake Manifold Bracket (With Specifications)**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

6. Install exhaust pipe A. Use new gaskets (B) and new self-locking nuts (C).

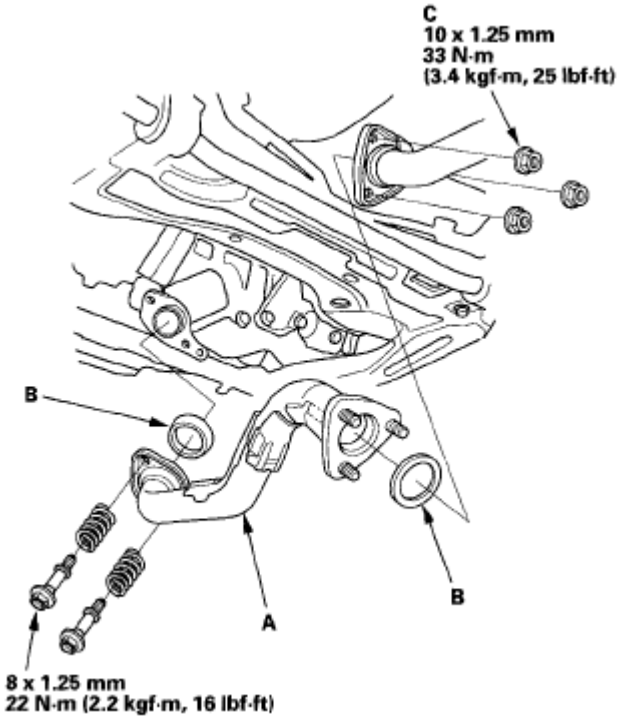


**Fig. 24: Installing Exhaust Pipe (With Specifications)**

**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

7. Connect the positive cable to the battery first, then connect the negative cable.
8. Start the engine to make sure the starter works properly.
9. Enter the anti-theft code for the audio system and the navigation system (if equipped), then enter the audio presets.
10. Set the clock (on vehicles without navigation.

## STARTER OVERHAUL

**M/T**

**Disassembly/Reassembly**

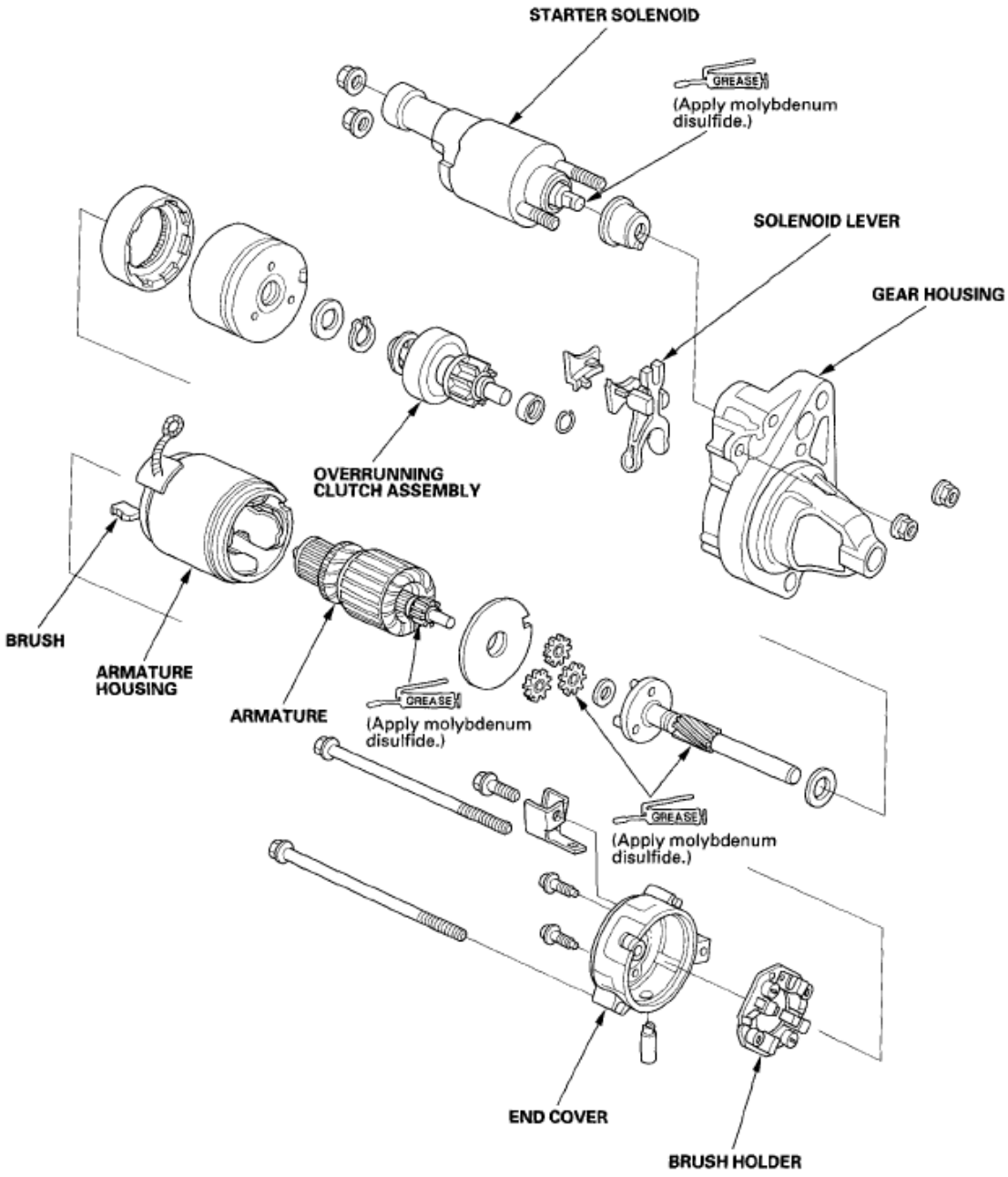


**Fig. 25: Disassembly/Reassembly Of Starter Overhaul (M/T)**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

### Armature Inspection and Test

1. Remove the starter (see **STARTER REMOVAL AND INSTALLATION** ).
2. Disassemble the starter as shown at the beginning of this procedure.
3. Inspect the armature for wear or damage from contact with the permanent

magnet. If there is wear or damage, replace the armature.

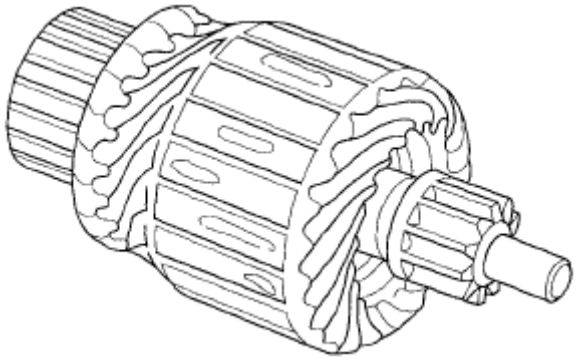

**Fig. 26: Inspecting Armature For Wear Or Damage**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Check the commutator (A) surface. If the surface is dirty or burnt, resurface it with an emery cloth or a lathe to the following specifications, or recondition with #500 or #600 sandpaper (B).

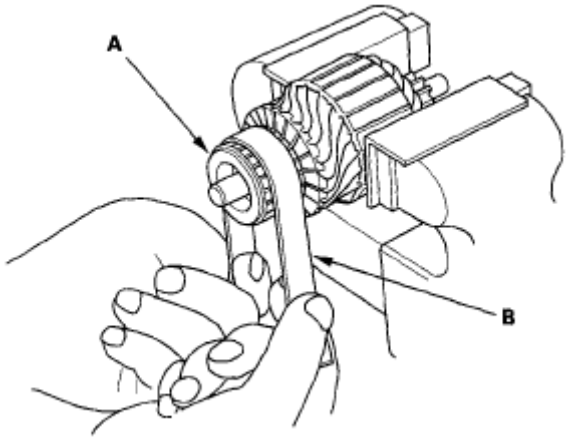


**Fig. 27: Checking Commutator Surface**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

5. Check the commutator diameter. If the diameter is below the service limit, replace the armature.

**Commutator Diameter**

**Standard (New): 28.0 mm (1.10 in.)**

**Service Limit: 27.0 mm (1.06 in.)**

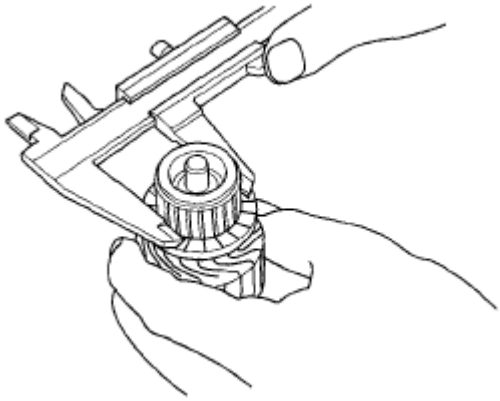

**Fig. 28: Checking Commutator Diameter**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

6. Measure the commutator (A) runout.
   - If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
   - If the commutator runout is not within the service limit, replace the armature.

**Commutator Runout**

**Standard (New): 0.02 mm (0.001 in.) max.**
**Service Limit: 0.05 mm (0.002 in.)**

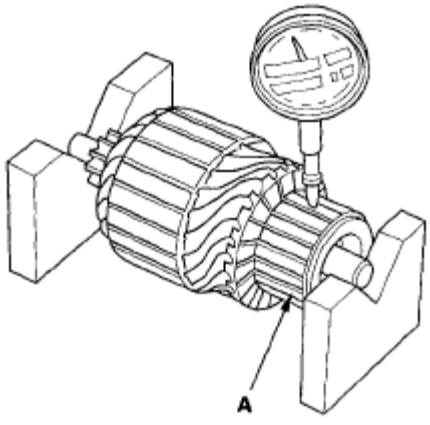


**Fig. 29: Checking Commutator Runout**

**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

7. Check the mica depth (A). If the mica is too high (B), undercut the mica with a hacksaw blade to the proper depth. Cut away all the mica (C) between the commutator segments. The undercut should not be too shallow, too narrow, or V-shaped (D).

**Commutator Mica Depth**

**Standard (New): 0.50-0.80 mm (0.020-0.031 in.)**
**Service Limit: 0.2 mm (0.008 in.)**

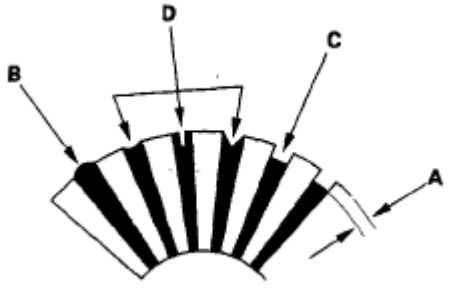


**Fig. 30: Checking Commutator Mica Depth**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

8. Check for continuity between the segments of the commutator. If there is open circuit between any of the segments, replace the armature.

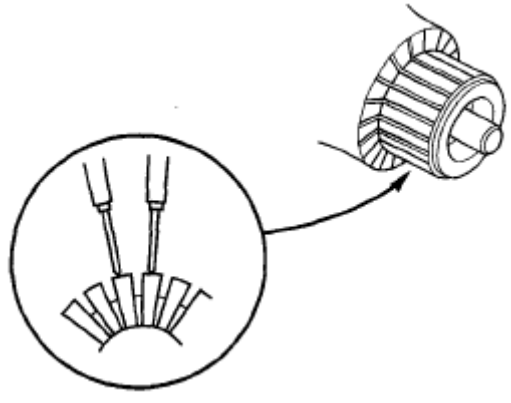

**Fig. 31: Checking Continuity Between Segments Of Commutator**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

9. Place the armature (A) on an armature tester (B). Hold a hacksaw blade (C) on the armature core. If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.

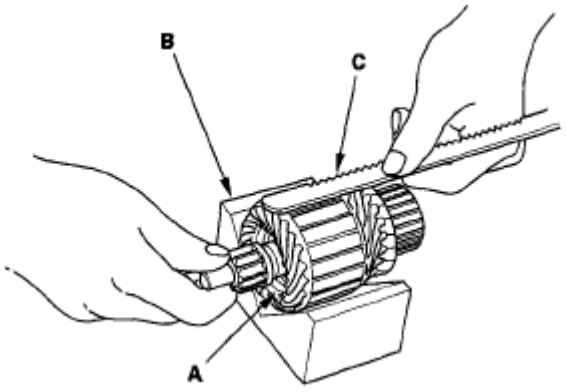


**Fig. 32: Placing Armature On Armature Tester**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

10. Check for continuity between the commutator (A) and the armature coil core (B), and between the commutator and the armature shaft (C). If there is continuity, replace the armature.

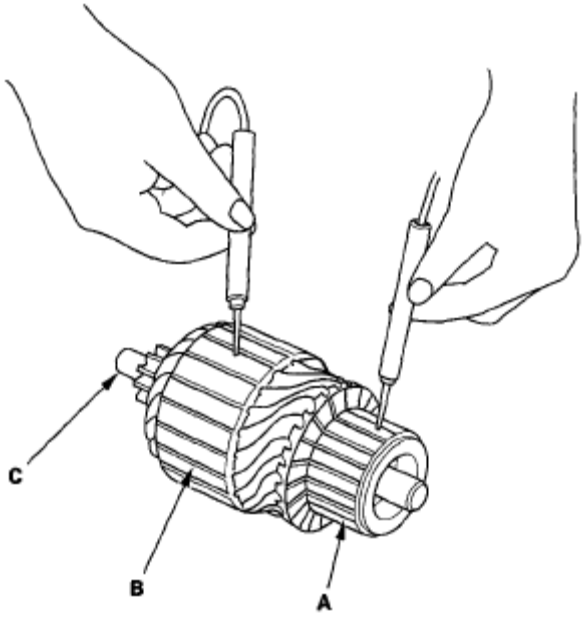


**Fig. 33: Checking Continuity Between Commutator And Armature Coil Core**

**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Starter Brush Inspection**

11. Measure the brush length. If it is not within the service limit, replace the brush holder assembly.

**Brush Length**

**Standard (New): 14.0-14.5 mm (0.55-0.57 in.)**
**Service Limit: 9.0 mm (0.35 in.)**

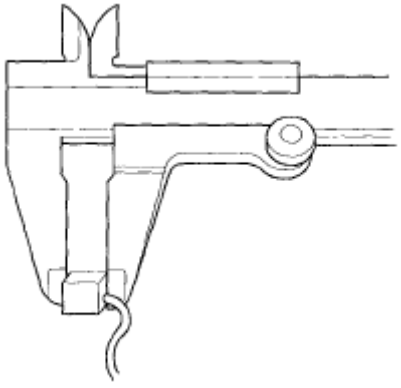

**Fig. 34: Measuring Brush Length**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Starter Field Winding Test**

12. Check for continuity between the brushes (A). If there is no continuity, replace the armature housing (B).

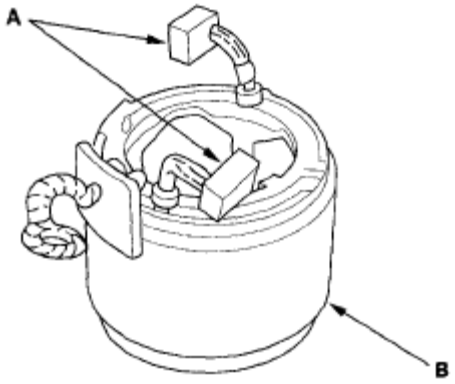


**Fig. 35: Checking Continuity Between Brushes**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

13. Check for continuity between each brush (A) and the armature housing (B). If there is continuity, replace the armature housing.

**Starter Brush Holder Test**

14. Check for continuity between the (+) brush holder (A) and (-) brush holder (B). If there is continuity, replace the brush holder assembly.

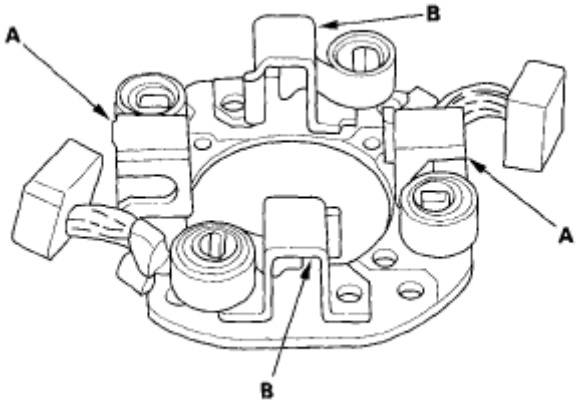


**Fig. 36: Checking Continuity Between Brush Holder**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Brush Spring Inspection**

15. Insert the brush (A) into the brush holder, and bring the brush into contact with the commutator, then attach a spring scale (B) to the spring (C). Measure the spring tension at the moment the spring lifts off the brush.

**Spring Tension: 13.7-17.7 N (1.40-1.80 kgf, 3.09-3.97 lbf)**

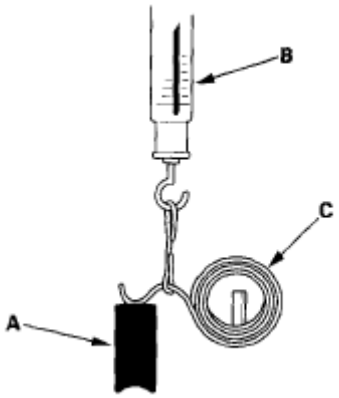


**Fig. 37: Measuring Spring Tension**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Overrunning Clutch Inspection**

16. Slide the overrunning clutch (A) along the shaft. Replace it, if it does not slide smoothly.

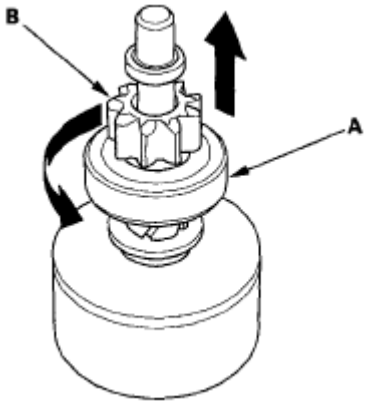


**Fig. 38: Sliding Overrunning Clutch Along Shaft**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

17. Hold the drive gear (B), and turn the overrunning clutch in the direction shown to make sure it turns freely. Also make sure the overrunning clutch locks in the opposite direction.
18. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

**Starter Reassembly**

19. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder. Release the spring to hold it in place.

**NOTE: To seat new brushes, slip a strip of # 500 or # 600 sandpaper, with the grit side up, between the commutator and each brush, and smoothly turn the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.**

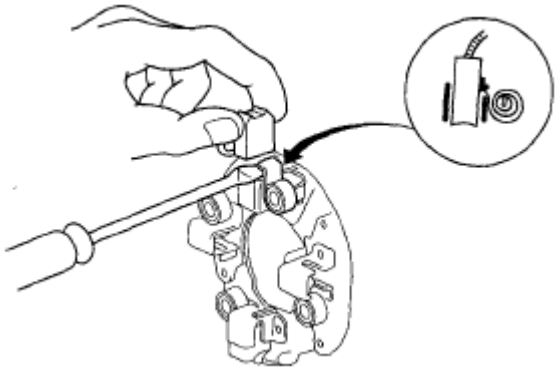

**Fig. 39: Prying Brush Spring With Screwdriver**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

20. Install the armature in the housing, and install the brush holder. Next, pry back each brush spring again, and push the brush down until it seats against the commutator, then release the spring against the end of the brush.

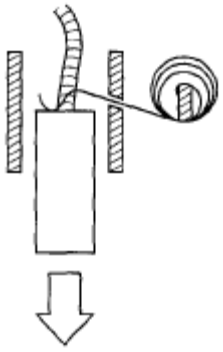

**Fig. 40: Installing Armature In Housing**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

21. Install the starter end cover to retain the brush holder.

**A/T**

**Disassembly/Reassembly**

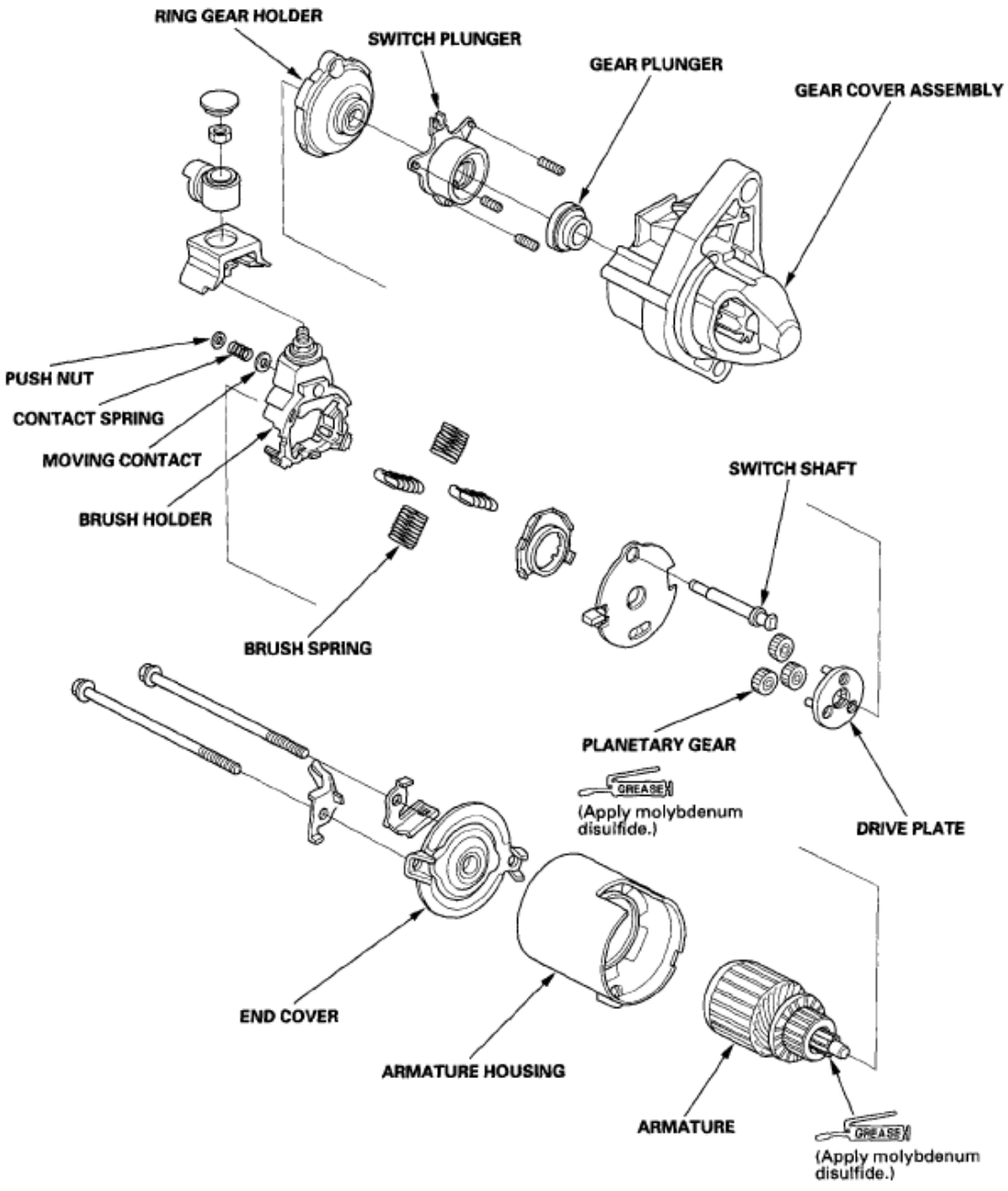


**Fig. 41: Disassembly/Reassembly Of Starter Overhaul (A/T)**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

### Armature Inspection and Test

1. Remove the starter (see **STARTER REMOVAL AND INSTALLATION** ).
2. Disassemble the starter as shown at the beginning of this procedure.
3. Inspect the armature for wear or damage from contact with the permanent

magnet. If there is wear or damage, replace the armature.

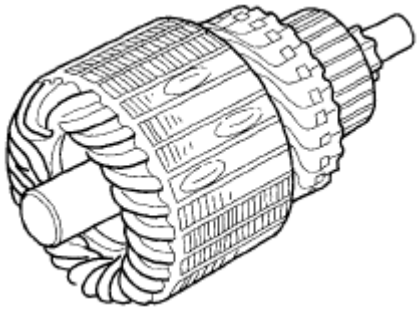

**Fig. 42: Inspecting Armature For Wear Or Damage**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

4. Check the commutator (A) surface. If the surface is dirty or burnt, resurface it with an emery cloth or a lathe to the following specifications, or recondition with #500 or #600 sandpaper (B).

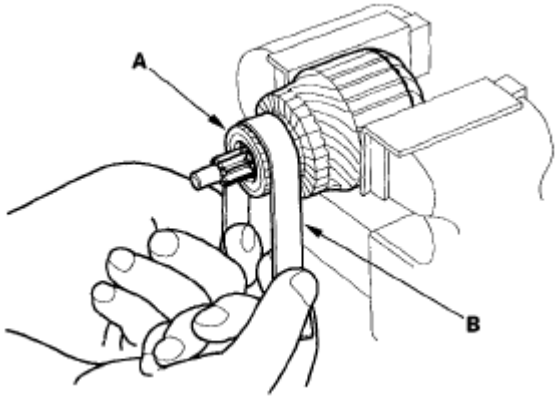


**Fig. 43: Checking Commutator Surface**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

5. Check the commutator diameter. If the diameter is below the service limit, replace the armature.

**Commutator Diameter**

**Standard (New): 28.0-28.1 mm (1.102-1.106 in.)**
**Service Limit: 27.5 mm (1.083 in.)**

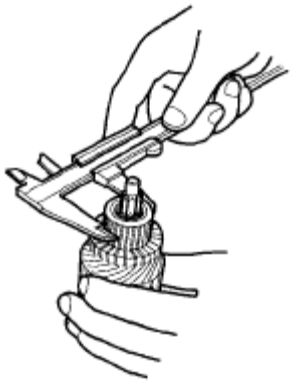

**Fig. 44: Checking Commutator Diameter**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

6. Measure the commutator (A) runout.
   - If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
   - If the commutator runout is not within the service limit, replace the armature.

   **Commutator Runout**

   **Standard (New): 0.02 mm (0.001 in.) max.**
   **Service Limit: 0.05 mm (0.002 in.)**

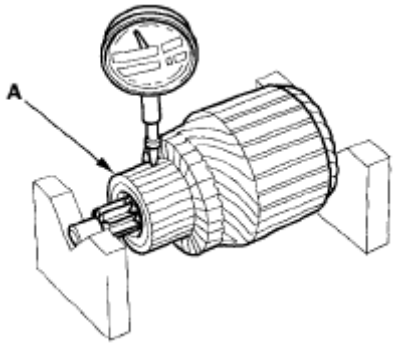


**Fig. 45: Measuring Commutator Runout**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

7. Check the mica depth (A). If the mica is too high (B), undercut the mica with a hacksaw blade to the proper depth. Cut away all the mica (C) between the

commutator segments. The undercut should not be too shallow, too narrow, or V-shaped (D).

**Commutator Mica Depth**

**Standard (New): 0.40-0.50 mm (0.016-0.020 in.)**
**Service Limit: 0.15 mm (0.006 in.)**

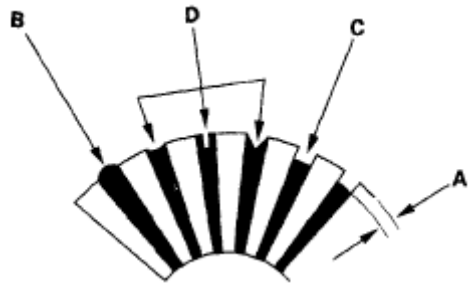


**Fig. 46: Checking Commutator Mica Depth**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

8. Check for continuity between the segments of the commutator. If there is an open circuit between any of the segments, replace the armature.

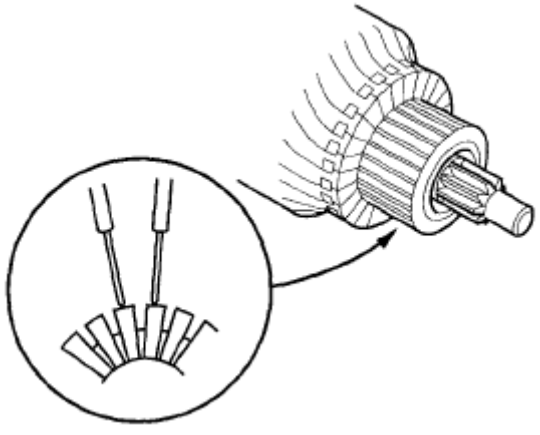

**Fig. 47: Checking Continuity Between Segments Of Commutator**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

9. Place the armature (A) on an armature tester (B). Hold a hacksaw blade (C) on the armature core. If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.

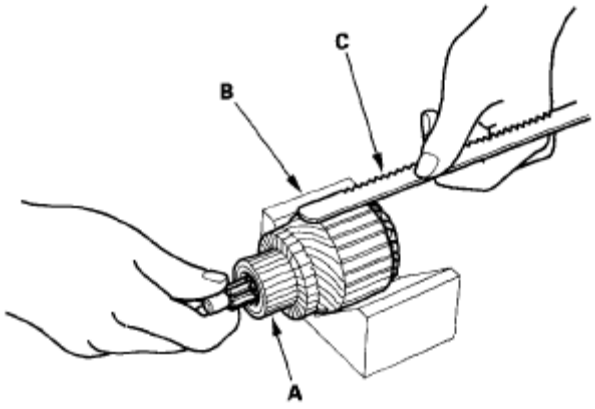


**Fig. 48: Placing Armature On Armature Tester**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

10. Check with an ohmmeter for continuity between the commutator (A) and the armature coil core (B), and between the commutator and the armature shaft (C). If there is continuity, replace the armature.

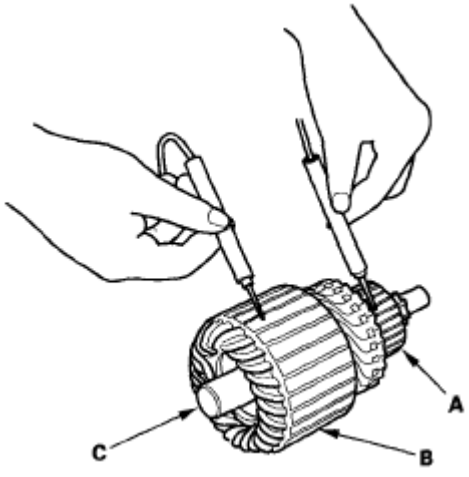


**Fig. 49: Checking Continuity Between Commutator And Armature Coil Core**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Starter Brush Inspection**

11. Measure the brush length. If it is shorter than the service limit, replace the brush holder assembly.

**Brush Length**

**Standard (New): 11.1-11.5 mm (0.44-0.45 in.)**
**Service Limit: 4.3 mm (0.17 in.)**

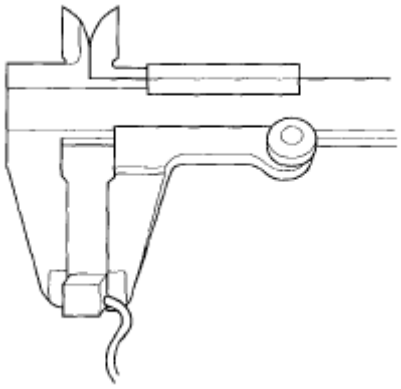

**Fig. 50: Measuring Brush Length**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Starter Brush Holder Test**

12. Check for continuity between the (+) brush (A) and (-) brush (B). If there is continuity, replace the brush holder assembly.

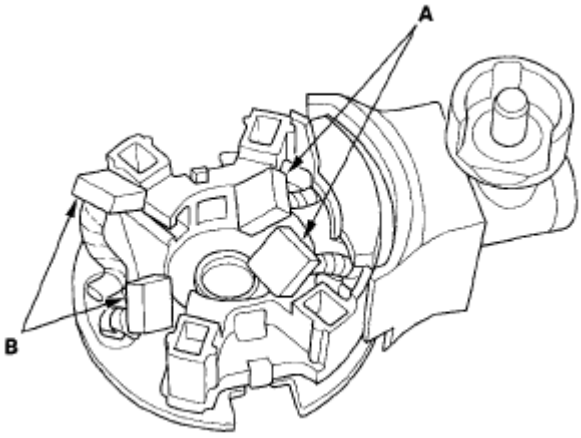


**Fig. 51: Checking Continuity Between Brush**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Planetary Gear Inspection**

13. Check the planetary gears (A) and ring gear (B). Replace them if they are worn or damaged.

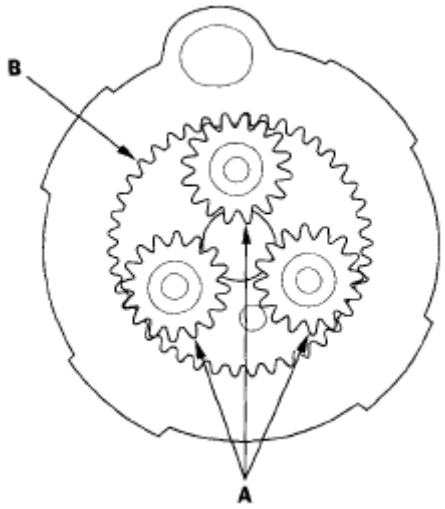


**Fig. 52: Checking Planetary Gears And Ring Gear**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

**Overrunning Clutch Inspection**

14. While holding the drive gear (A), turn the gear shaft (B) counterclockwise. Check that the drive gear comes out to the other end. If the drive gear does not move smoothly, replace the gear cover assembly.

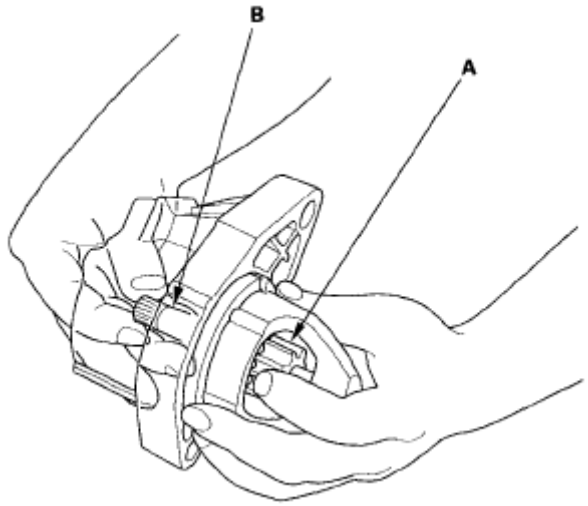


**Fig. 53: Turning Gear Shaft Counterclockwise**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

15. While holding the drive gear, turn the gear shaft clockwise. The gear shaft should turn freely. If the gear shaft does not turn freely, replace the gear cover

assembly.

16. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

    Check the condition of the torque converter ring gear to see if the starter drive gear teeth are damaged.

    **Starter Reassembly**

17. Install the brush into the brush holder, and set the armature (A) in the brush holder (B).

    **NOTE: To seat the new brushes, slip a strip of #500 or # 600 sandpaper, with the grit side up, between the commutator and each brush, and smoothly turn the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.**

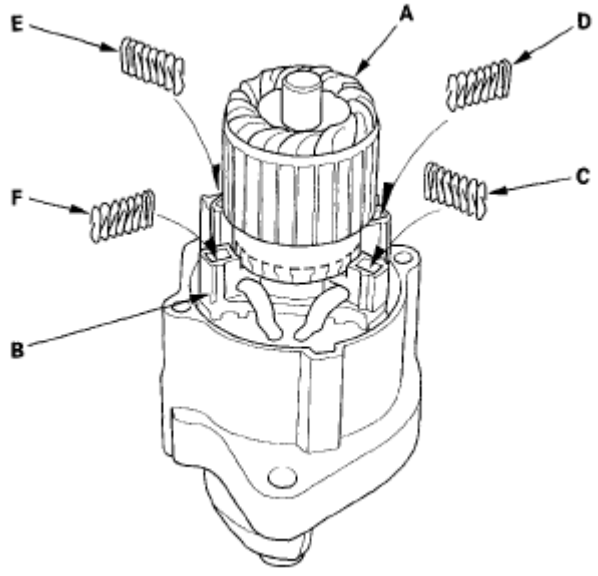


**Fig. 54: Installing Brush Into Brush Holder**
**Courtesy of AMERICAN HONDA MOTOR CO., INC.**

18. While squeezing a spring (C), insert it in the hole on the brush holder, and push it until it bottoms. Repeat this for the other three springs (D, E, and F).

19. Install the armature and brush holder assembly into the housing.

**NOTE: Make sure the armature stays in the holder.**